Questions and Answers About Cryosurgery in Cancer Treatment

1. What is cryosurgery?

Cryosurgery (also called cryotherapy) is the use of extreme cold to destroy cancer cells. Traditionally, it has been used to treat external tumors, such as those on the skin, but recently some physicians have begun using it as a treatment for tumors that occur inside the body. Cryosurgery for internal tumors is increasing as a result of developments in technology over the past several years.

For external tumors, liquid nitrogen (-196 degrees Celsius, -320.8 degrees Fahrenheit) is applied directly to the cancer cells with a cotton swab or spraying device. For internal tumors, liquid nitrogen is circulated through an instrument called a cryoprobe, which is placed in contact with the tumor. To guide the cryoprobe and to monitor the freezing of the cells, the physician uses ultrasound (computerized moving pictures of the body generated by high-frequency sound waves). By using ultrasound, physicians hope to spare nearby healthy tissue.

Cryosurgery often involves a cycle of treatments in which the tumor is frozen, allowed to thaw, and then refrozen.

2. What types of cancer can be treated with cryosurgery?

Cryosurgery is being evaluated in the treatment of a number of cancers, including prostate cancer and cancer that affects the liver (both primary liver cancer and cancer that has spread to the liver from another site). Researchers also are studying its effectiveness as a treatment for some tumors of the bone, for brain and spinal tumors, and for tumors in the windpipe that may develop with non-small cell lung cancer. In addition, some researchers are using cryosurgery in combination with other cancer treatments such as radiation, surgery, and hormone therapy. While initial results of cryosurgical treatment are encouraging, researchers have not yet drawn any solid conclusions regarding its long-term effectiveness.

For certain types of cancer and precancerous conditions, however, cryosurgery has proven to be an effective therapy. It has traditionally been used to treat retinoblastoma (a childhood cancer that affects the retina of the eye) and early-stage skin cancers (both

basal cell and squamous cell carcinomas). Precancerous skin growths known as actinic keratosis and the precancerous condition cervical intraepithelial neoplasia (abnormal cell changes in the cervix that can develop into cervical cancer) also can be treated with cryosurgery.

3. When might cryosurgery be used to treat prostate cancer?

Cryosurgery may be used to treat men with early-stage cancer that is confined to the prostate gland, particularly when standard treatments such as surgery and radiation are unsuccessful or cannot be used. For men in good physical condition with cancer limited to the prostate, however, the standard treatments of prostatectomy (surgical removal of the prostate) or radiation therapy are usually considered better options. Cryosurgery is not considered an effective treatment for prostate cancer that has spread outside the gland, or to distant parts of the body.

In addition, although cryosurgery may be considered an alternative to surgery or radiation therapy in a limited number of cases, its long-term effectiveness has not been demonstrated conclusively.

4. When might cryosurgery be used to treat liver cancer or liver metastases (cancer that has spread to the liver from another part of the body)?

Whether tumors originate in the liver (called primary liver cancer) or spread to the liver from another site (such as the colon or rectum), surgical removal often is not possible. Physicians often use chemotherapy to treat patients with inoperable liver tumors; however, cryosurgery may be used to control the cancer and, therefore, may present another treatment option for these individuals. In some cases, surgical removal of tumors is possible, and cryosurgery may be used as an additional treatment in an attempt to increase the patient's long-term disease-free survival.

5. Does cryosurgery have any complications or side effects?

Cryosurgery does have side effects, although they may be less severe than those associated with surgery or radiation therapy. Cryosurgery in the liver may cause damage to the bile ducts and/or major blood vessels, which can lead to hemorrhage (heavy bleeding) or infection. Cryosurgery for prostate cancer may affect the urinary system. It also may cause incontinence (lack of control over urine flow) and impotence (loss of sexual function), although these side effects are often temporary. Cryosurgery for cervical intraepithelial neoplasia has not been shown to affect fertility, but this possibility is under study. More studies must be conducted to determine the long-term effects of cryosurgery.

6. What are the advantages of cryosurgery?

Cryosurgery offers some advantages over other methods of cancer treatment. It is less invasive than surgery, involving only a small incision or insertion of the cryoprobe

through the skin. Consequently, pain, bleeding, and other complications of surgery are minimized. Cryosurgery is less expensive than other treatments and requires shorter recovery time and a shorter hospital stay.

Because physicians can focus cryosurgical treatment on a limited area, they can avoid the destruction of nearby healthy tissue. The treatment can be safely repeated and may be used along with standard treatments such as surgery, chemotherapy, and radiation. Furthermore, cryosurgery may offer an option for treating cancers that are considered inoperable or that do not respond to standard treatments.

7. What are the disadvantages of cryosurgery?

The major disadvantage of cryosurgery is the uncertainty surrounding its long-term effectiveness. While cryosurgery may be effective in treating tumors made visible to the physician through imaging tests (tests that produce pictures of areas inside the body), it can miss microscopic cancer spread. Furthermore, because the effectiveness of the technique is still being assessed, insurance coverage issues may arise.

8. What does the future hold for cryosurgery?

Additional studies are needed to determine the effectiveness of cryosurgery in controlling cancer and improving survival. Data from these studies will allow physicians to compare cryosurgery with standard treatment options such as surgery, chemotherapy, and radiation. Moreover, physicians continue to examine the possibility of using cryosurgery in combination with other treatments.

9. Where is cryosurgery currently available?

Cryosurgery is widely available in gynecologists' offices for the treatment of cervical neoplasias. A limited number of hospitals and cancer centers throughout the country currently have skilled physicians and the necessary technology to perform cryosurgery for other precancerous and cancerous conditions. Individuals can consult with their doctors or contact hospitals and cancer centers in their area to find out where cryosurgery is being used.

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Sources of National Cancer Institute Information

Cancer Information Service

Toll-free: 1–800–4–CANCER (1–800–422–6237)
TTY (for deaf and hard of hearing callers): 1–800–332–8615

NCI Online

Internet

Use http://www.cancer.gov to reach NCI's Web site.

CancerMail Service
To obtain a contents list, send e-mail to cancermail@icicc.nci.nih.gov with the word "help" in the body of the message.

CancerFax® fax on demand service
Dial 301–402–5874 and listen to recorded instructions.

This fact sheet was reviewed on 1/17/97